Economic and environmental problem and impact of a Stubble :

Special Reference to Delhi (2010-2022)

Swami Ramanand Teerth Marathwada University, Nanded
A brief outline of the thesis to be submitted for the degree Ph.D in economics under the Faculty ofHumanities

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INTRODUCTION

Stubble called PARALI in local language in Punjab and Haryana. The practice of burning stubble or crop residue includes stems, leaves stalks of paddy mainly.

This is done to ready the field for next wheat crop (Rabi) after paddy is harvested and stubble left with no other easy option to dispose off.

In September to November this practice is done in Punjab and Haryana after ripe paddy is harvested by machine leaving residue, as farmers have not enough time to let it decompose by itself so they use stubble burning as an instant solution to clear field. It is low cost alternative to tilling in straws.

Recently trends of burning wheat residue in last few years with mechanised harvester in North India especially Punjab, Haryana and UP on large scale. State Government has implemented policy for management of crop residue. National Green Tribunal (NGTS) banned it.

Burning parali makes soil and air toxic. There is a state of Environmental emergency since last few years. Severe air pollution is witnessed in National Capital Region (NCR) when PM 10 and PM 2.5 touches 990ug/M3. The safe limit is ten times less than this.

During environment emergency schools and colleges are closed. Children, infants and older are advised to stay indoors to save from menace of air pollution.

STATEMENT OF PROBLEM

Stubble burning in itself is a regional environmental issue of Delhi and its surrounding areas directly cause climate change.Damaging from environment to Human is like a slow poison taking every day bit by bit on nature's health

Socio-economic challenges in Delhi region due to stubble burning

AIR POLLUTION- Air quality in Delhi, capital of India according to WHO survey is worst of any major city in World. It kills two millions people every year in India. Chronic Respiratory diseases and asthama causing death due to poor air quality.Air quality index of Delhi is between 301-400 and more shows

Severe conditions due to stubble burning.Delhi government has install machines to purify air but it is not much useful. They need to invest in air quality improvement measures and strict regulations on odd even vehicle use

HUMAN HEALTH- Parali burning has ill effects on health as it has harmful gases methane, carbon monoxide, carcinogenic polycyclic aromatic hydrocardon, PM 2.5, PM10 damage health disasterly and fifty per cent children of Delhi are victims to it. It increases health care expenses and most people donot have any health insurance led to out of pocket expenditure. Government need to run awareness campaign to reduce poor air quality on individual basis and community cooperation.

LOWERING SOIL NUTRIENTS- Burning stubble damages soil quality and it become deficient of needed nutrients, added carbon and heat reduce fertility and increase erosion. Reduce agricultural productivity affecting tax revenue.Risk of fire spreading out of control is also a danger.

ECONOMIC COST TO TOURISM- Survey on tourism, 2018 reparted decrease in no. of tourists by 30 per cent as a result of poor Air quality causing havoc pollution. The cost of Air Pollution due to Stubble burning estimated at $30 billion annually.

SOCIAL IMPACT-Closure of administrative office delay procedural works. Schools closed for two to three weeks affect education. Overall it costs us a good standard of life to breathe in fresh air.

ECONOMIC IMPACT- Slow traffic and accidents due to smog, delay in flights and trains, sometimes cancellation disrupt regular activity.

IMPORTANCE OF RESEARCH SUBJECT

Stubble Burning is an grave issue and finding its solution is of utmost importance. Decision by Supreme Court, National Green Tribunal, NITI Aayog, Ministry of New & Renewable Energy, Gol, PMO Panel of Experts showing their concern to Stubble Burning shows its importance.

STATUS OF RESEARCH SUBJECT

IARI (Indian Agricultural Research Institute publish report showing decreasing trend of stubble burning in last three years

The Consortium for Research on Agroecosystem Monitoring and Modelling from Space (CREAMS) run

by IARI monitor stubble burning and provide daily report. The Punjab Govt. assured Commission for Air Quality

Management (CAQM) to reduce it by 50% ● To quantify contribution of stubble burning in air quality in

NCR region, we use AQEWS Of IITM, Pune

OBJECTIVE OF RESEARCH SUBJECT

1) **To understand the reasons of Stubble Burning and way toMinimize it.**
2) **To study socio-economic problems related to it.**
3) **Investigate alternative disposal of Parali and its best use.**
4) **To identify constraints face by govt to stop this burning Stubble practice.**

HYPOTHESIS OF RESEARCH

1) **There is a negative impact of a Stubble burning on people's health.**
2) **There is financial losses due to economic and environmental issues of a Stubble.**
3) **Stubble burning effect air quality of Delhi that leads to poor AQI.**
4) **Panjab and Haryana's farmers reduce the Stubble improve environmental condition**

METHODOLOGY OF SUBJECT

This deals with area selected for study and doing field research, methods adopted in the selection of samples, nature, and sources of data, analytical tools and techniques employed in analysing data.Selection of District of Punjab like Sangrur, Bhatinda, Firozpur, Muktsar

NATURE AND SOURCE OF DATA

Primary data - Field Survey (bhatinda, sangrur) Personal interview (respondents- farmers) Questionnaire - 500 people of different region NCR, Delhi, Punjab, Haryana, Noida Gurugram and Faridabad

50 questions were in this

1. **Problems related to health issues due bad air quality and expenses in hospital on health**

2. **What is challenges in adopting alternative method of stubble burning?**

3. **In your view what should be govt take to help farmers**

To stop stubble burning?

4. **Do you prefer to buy machines or take on rent?**

5. **Can able to use a smartphone?**

Secondary data- Necessary secondary data obtained from publised sources like journals, websites, state and central govt bodies reports Science Direct (Journal)- Environmental advances talk of effect on burning and air pollution causes in Delhi

National Institutes of Health in 2021- Contribution to Air Pollution in Delhi- Stubble burning activities in northwestern India

Multiple satellite systems play crucial role in detecting, monitoring and characterizing fires for location timing and burned area of active fires.

NASA's Terra and Aqua detects active fires

REVIEW OF SUBJECT

Some of the previous and relevant researches have following findings, these contribute in laying down the methodology guidelines and steps to be followed.

Bhuvaneshwari et al(2019) stated that crop residue left after harvesting covers almost one part of the field that creates particular strenuousness because of the excess amount and lack of propensity to supervise them. Changes around pollution can be seen by creation of CO2 CO, N2O and Nox in the soil which is an additional problem from high yielding.

Pratika Chawla explained that 32% and 40% of crop residue area which is burnt decreased in Patiala and Ludhiana in spite of this pollution level slightly increased. The amount of SO_2 released was found to be more in comparison with NOX

Camilia El-Dewany et al showed interest to highlight the problems that occurred from burning of rice straw like on individual's particularly for those who have respiratory issues and some other problems like irritation in eyes, nose.

Niti Gupta studied and set up sensors which took least effort and placed them across four regions in Punjab to screen PM 2.5 emissions, through ranchers explain their difficulties and as the arrangement what they want to see all data collected and through satellite data tried to explain the pattern of paddy build up copying in Punjab.

TOOL OF RESEARCH

Central Pollution Control Board

Air Quality Status for Delhi & NCR
Dated March 26, 2023

Current Air Quality Status :

Air Quality Index (AQ) (Average of past 24 hours)			
	Air Quality	**AQI Value**	**Prominent Pollutant**
Delhi	Moderate	164 ^	$PM_{2.5}$, O_3
Faridabad	Poor	236 ^	$PM_{2.5}$
Ghaziabad	Moderate	138 ^	PM_{10}
Greater Noida	Poor	216 ^	PM_{10}
Gurugram	Moderate	143^	$PM_{2.5}$
Noida	Moderate	166 ^	PM_{10}, $PM_{2.5}$

Data available for 37 stations in Delhi today **v, ^** arrows indicate a decrease/increase as compared to the value on the Previous Day.

Comparative status of AQI - Delhi from 01 January to 26 March 2016-2023																	
Category	**Year**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
	No. of days	81	85	85	85	85	85	85	85								
Good (0-50)		0	0	0	0	0	0	0	0								
Satisfactory (51-100)		0	0	0	1	7	0	3	2								
Moderate (101-200)		7	14	24	29	23	12	23	28	7	14	24	30	33	12	26	30
Poor (201-300)		27	47	37	27	35	36	41	32								

Very Poor (300-400)	41	24	21	21	15	31	17	20	74	71	61	55	52	73	59	55
Severe (>401)	6	0	3	7	2	6	1	3								

Year	PM 2.5
2018	58%
2019	44%
2020	42%
2021	48%

Year	Stubble burning
2020	4016
2021	6792
2022	3549

Haryana has recorded farm fires

Year	Fire Counts
2020	82693
2021	71181
2022	49604

Punjab has recorded farm fires

Both Haryana and Punjab has recorded lowest paddy residue burning events since 2020 to 2022. Punjab and Haryana witnessed reduction of fire counts by 30% and 48% respectively in last year

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SCOPE OF RESEARCH SUBJECT

My research in field on parali burning is mostly

Inclined towards being solution oriented and its

Easiest quickest alternative to help farmers Farmers can manage crop residue effectively by employing agricultural machines Happy Seeder (sowing of crop in standing stubble) Rotavator(prepare land and mix stubble in soil zero till seed drill Baler (collect straw and make bales of paddy)

Paddy Straw Chopper (cutting paddy stubble to mix in soil)

But these machines are too costly and not many farmers can afford

it for this state govt must give subsidy or make available on rent.

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